Energy Efficiency and Renewable Energy
Federal Energy Management Program

How to Buy an Energy-Efficient Residential Dishwasher

Why Agencies Should Buy Efficient Products

- *Executive Order 13123 and FAR section 23.704 direct agencies to purchase products in the upper 25% of energy efficiency, including all models that qualify for the EPA/DOE* ENERGY STAR® *product labeling program.*
- *Agencies that use these guidelines to buy efficient products can realize substantial operating cost savings and help prevent pollution.*
- *As the world's largest consumer, the federal government can help "pull" the entire U.S. market towards greater energy efficiency, while saving taxpayer dollars.*

Federal Supply Source:

- General Services Administration (GSA)
  Phone: (816) 926-2389 (Gail Allen)
  www.fss.gsa.gov

For More Information:

- DOE's Federal Energy Management Program (FEMP) Help Desk and World Wide Web site have up-to-date information on energy-efficient federal procurement, including the latest versions of these recommendations.
  Phone: (800) 363-3732
  www.eren.doe.gov/femp/procurement
- DOE has ENERGY STAR® dishwasher model listings.
  Phone: (800) 363-3732
  www.energystar.gov
- American Council for an Energy-Efficient Economy (ACEEE) publishes the *Consumer Guide to Home Energy Savings*.
  Phone: (202) 429-0063
  aceee.org
- Consumers Union publishes *Consumer Reports* magazine and the *Consumer Reports Annual Buying Guide*.
  Phone: (800) 500-9760
  www.consumerreports.org
- *Home Energy* magazine provides energy conservation tips.
  Phone: (510) 524-5405
  www.homeenergy.org
- Green Seal certifies dishwashers that meet this recommendation's energy efficiency guidelines, as well as other environmental criteria.
  Phone: (202) 588-8400
  www.greenseal.org
- Lawrence Berkeley National Laboratory provided supporting analysis for this recommendation.
  Phone: (202) 646-7950

Efficiency Recommendation

Product Type	Recommended		Best Available	
	kWh/yr.[a]	Energy Factor	kWh/yr.	Energy Factor
Standard[b] Dishwasher	555 or less	0.58 or more	277	1.16

a) Based on 322 wash cycles per year, where one cycle is one normal operation with a fully loaded machine.

b) This recommendation does not cover compact models.

Definition

Energy Factor is the inverse of the power consumption (in kWh) for one full wash cycle.

Where to Find Energy-Efficient Dishwashers

The federal supply source for dishwashers is the General Services Administration (GSA). GSA sells dishwashers through Schedule 41-I, as well as through its on-line shopping network, *GSA Advantage!* Look for models that meet this Efficiency Recommmendation.

When buying from a commercial source (retailer or distributor), choose models that qualify for the EPA/DOE ENERGY STAR® label (see "For More Information), all of which meet the recommended levels; some manufacturers and retailers display this label on complying models. Alternatively, look at the yellow "EnergyGuide" label to identify models that meet the Efficiency Recommendation. For a contractor-supplied dishwasher, specify an estimated annual energy use or energy factor that meets the recommended level.

Buyer Tips

Look for models with internal "booster heaters" (which permit lower water heater temperature settings), and "no-heat" drying options. These are both common features.

User Tips

To optimize efficiency, dishwashers should be run with full loads. Dishwashers can provide an efficient alternative to washing by hand when operated at full capacity.

Dishwasher Cost-Effectiveness Example

Performance	Base Model[a]	Recommended Level	Best Available
Energy Factor	0.46	0.58	1.16
Annual Energy Use	700 kWh	555 kWh	277 kWh
With Electric Water Heating			
Annual Energy Cost	$42	$33	$17
Lifetime Energy Cost	$400	$320	$160
Lifetime Energy Cost Savings	–	**$80**	**$240**
With Gas Water Heating			
Annual Energy Cost	$21	$16	$13
Lifetime Energy Cost	$220	$170	$90
Lifetime Energy Cost Savings	–	**$50**	**$130**

a) The efficiency (Energy Factor) of the Base Model is just sufficient to meet current U.S. DOE national appliance standards.

Definition

Lifetime Energy Cost is the sum of the discounted value of annual energy costs based on average usage and an assumed dishwasher life of 13 years. Future energy price trends and a discount rate of 3.4% are based on federal guidelines (effective from April, 2000 to March, 2001).

Cost-Effectiveness Assumptions

Annual energy use in this example is based on the standard DOE test procedure for a standard capacity model undergoing 322 wash cycles per year. Energy used to heat water accounts for roughly two-thirds of the total energy use shown. The actual percentage will vary based on differences in design, variations in use of drying cycle, efficiency of the water heater, and operating conditions. The assumed electricity and gas prices are 6¢/kWh and 40¢/therm, the federal average energy prices in the U.S.

Using the Cost-Effectiveness Table

In the example shown above, a dishwasher supplied with electrically heated water, with an energy factor of 0.58, is cost-effective if its purchase price is no more than $80 above the price of the Base Model. The Best Available model, with an energy factor of 1.16, will be cost-effective if its price is no more than $240 above the price of the Base Model. These savings figures are based on energy consumption alone, excluding likely savings from lower water use.

In the example shown above, a dishwasher supplied with gas-heated water, with an energy factor of 0.58, is cost-effective (on energy savings alone, excluding water savings) if its purchase price is no more than $50 above the price of the base model. The Best Available model, with an energy factor of 1.16, will be cost-effective if its price is no more than $130 above the price of the Base Model.

What if my Energy Prices are different?

To calculate Lifetime Energy Cost Savings for a different electricity price, when water heating is electric, multiply the savings in the above table by this ratio: $\left(\frac{Your\ price\ in\ ¢/kWh}{6.0\ ¢/kWh}\right)$. When water heating is with gas, a conversion for both electric and gas price needs to be performed. A good approximation can be reached by multiplying 70% of the table's reported Lifetime Energy Cost Savings by the electric ratio, above; the remainder (30%) should be multiplied by: $\left(\frac{Your\ price\ in\ ¢/therm}{40.0\ ¢/therm}\right)$. The sum of these two will provide a close estimate of your Lifetime Energy Cost Savings.

Metric Conversion

1 therm = 100,000 Btu
= 29.3 kWh
= 105.5 MJ

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